Wells Quadrangle, Maine

Surficial geologic mapping by
Geoffrey W. Smith

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

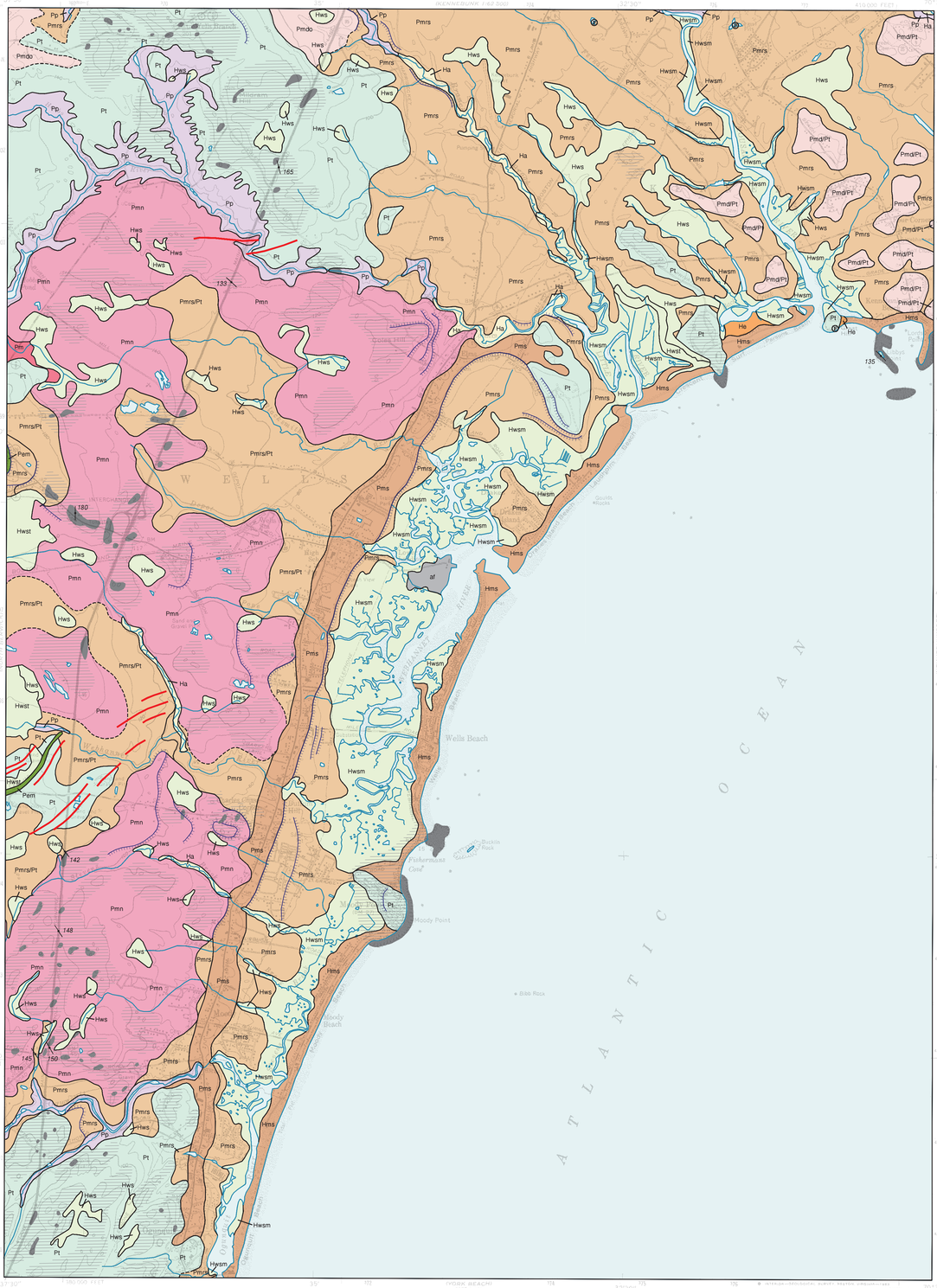
Funding for the preparation of this map was provided by the Maine Geological Survey.

Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 **E-mail:** mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/nrimc.htm

Open-File No. 99-104
1999

For additional information, see Open-File Report 99-135.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Geoffrey W. Smith completed during the 1984 and 1985 field seasons; funding for this work provided by the Maine Geological Survey. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1988. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Wells quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Ha — **Stream alluvium** - Gray to brown fine sand and silt with some gravel. Comprises flood plains along present streams and rivers. Extent of alluvium approximates areas of potential flooding.

He — **Eolian deposits** - Sand dunes resulting from wind erosion of modern beach sediments.

Hws — **Wetland, swamp*** - Muck, peat, silt, and sand. Poorly drained areas, often with standing water.

Hwsm — **Wetland, saltmarsh** - Muck, peat, silt, and sand. Coastal settings subject to tidal fluctuation.

Hms — **Marine shoreline deposit, beach** - Sand, some gravel, and minor silt. Coastal settings of active beach construction.

Pm — **Marine deposits (undifferentiated)** - Pp and/or Pmrs deposits mapped in areas of poor access or poor exposure, or where both units occur as areas too small to be mapped separately. Thickness variable within range described for Pp and Pmrs.

Pmn — **Marine nearshore deposits** - Areas of till that have been reworked by the sea during regressive phase of marine submergence. Till has had finer constituents (silt and sand) removed and redeposited as thin veneer over till. Bedrock commonly at shallow depth. Average thickness probably less than 3 m. Locally, this unit may include marine clay and sand, as well as isolated boulders.

Pmrs — **Marine regressive sand deposits** - Massive to stratified and cross-stratified, well sorted brown to gray-brown sand. Generally with gradational basal contact to Pp. Thickness between 1 and 5 m. Deposited during regressive phase of marine submergence.

Pp — **Presumpscot Formation** - Massive to laminated gray and blue-gray (weathering brown) silt and silty clay. Locally may contain boulders, sand, and gravel. Occurs as blanket deposit over bedrock and older glacial sediments. Variable thickness from less than 1 m to more than 50 m. Deposited during period of late-glacial marine submergence.

Pms — **Marine shoreline deposit** - Predominantly sand with minor gravel. Beach deposits formed during period of stillstand in regressive phase of marine submergence. Thickness generally less than 3 m in beach ridges.

Pmd — **Marine delta** - Coarse sand and gravel grading to sand and silt. Flat to gently sloping constructional surface formed by glacial streams discharging into late glacial sea. Distal deltaic sediments (Pmdo) commonly grade into glacial-marine sediments (Pp, Pmrs).

Pem — **End moraine** - Coarse gravel and sand, some till and silt. Generally occurs within glacial-marine sediments (Pp, Pmrs) and is complexly interstratified with them. Formed at or near the ice front during retreat of marine-based glacier. Sediments commonly display significant deformation. Typically 5 to 10 m thick.

Pt — **Till** - Gray to gray brown poorly sorted mixture of silt, sand, pebbles, cobbles, and boulders. Forms a blanket deposit over bedrock and is inferred to underlie younger sediments where not exposed at surface. Thin over topographic highs, thickens in topographic lows. May occur in and over end moraines (Pem). Averages 3 to 5 m in thickness.

Bedrock - Rock units not distinguished. Individual outcrops not shown in large areas of poor access. Ruled pattern indicates areas where surficial materials are thin (less than 1 to 2 m) and bedrock exposures are common. Areas of bedrock exposure (gray areas) are mapped in part from aerial photographs.

af — **Artificial fill** - Man-made landfill.

Contact - Boundary between map units (dashed where approximate).

End moraine - Ridge of sand and gravel or till deposited at margin of glacier. May be largely buried by younger sediments.

135 — **Azimuth of glacial striation.**

Scarp - Symbol indicates scarps formed by stream erosion, or by marine erosion during period of higher sea level. Ticks are on downslope side of scarp line.

Area of many large boulders.

10,150±450 P — **Marine fossil locality.**

*NOTE: Wetland symbols followed by "t" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Smith, G. W., 1999, Surficial geology of the Wells 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-135, 8 p.
2. Smith, G. W., 1998, Surficial materials of the Wells quadrangle, Maine: Maine Geological Survey, Open-File Map 98-164.
3. Neil, C. D., 1998, Significant sand and gravel aquifers of the Wells quadrangle, Maine: Maine Geological Survey, Open-File Map 98-130.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.